Vehicle Seat

The invention relates to a vehicle seat according to the precharacterizing clause of claim 1.

In order to obtain considerable temperature-conditioned comfort of the seat, vehicle seats of this type are provided with an "active seat ventilation", in which air is sucked up from the passenger compartment and is blown through the cushions of seat cushion and backrest in order then partially to emerge via the air-permeable cushion cover toward the front side of the seat. This air, firstly, removes moisture and heat from the cushion and, secondly, cools the heated surfaces of the cushion.

In the case of a known vehicle seat with active seat ventilation (DE 198 04 284 C2), the backrest has a backrest cushion and a backrest covering which covers the rear side of the backrest, with a cavity remaining between backrest cushion and backrest covering. The backrest cushion is composed of a pressure-distributing layer which is fixed on a cushion support and has an inflow opening, arranged at the lower end, for ventilation air, and of an air-permeable ventilation layer of rubberized hair which rests on top and is covered by an air-permeable cushion cover. A ventilator which sucks up air from the cavity and blows it into the ventilation layer is arranged at the inflow opening. The ventilation air flows through the ventilation layer and emerges again via an air outflow opening arranged at the upper end. Some of the ventilation air also flows out of the pores of the cushion cover, in particular if the vehicle seat is unoccupied. The effectiveness of an active seat ventilation of this type in respect of increased temperature-conditioned comfort of the seat presupposes that the cavity of the backrest contains a sufficient

amount of fresh air which flows into the cavity from the passenger compartment, in particular from the floor.

In the case of rear seats, the backrest is arranged directly on the passenger compartment rear wall which separates the passenger compartment from the trunk. In some motor vehicles, there are installed in the trunk, in the region of the rear wall or separating wall, a multiplicity of units and electric control units which give off a relatively large amount of heat and therefore heat up the intermediate space which is still present between the backrest and the rear wall of the passenger compartment. For the active seat ventilation which sucks up air from the intermediate space and blows it into the ventilation layer of the backrest cushion, only relatively warm suction air is still available, and so sufficient cooling of the seat cannot be achieved. The seat user of the rear seat lacks, when sitting on it, the sensation of freshness which provides the temperature-conditioned comfort of the seat.

The invention is based on the object, in the case of a vehicle seat of the type mentioned at the beginning, of changing the active seat ventilation in such a manner that, even when the vehicle seat is used as a rear seat and is installed on the rear wall of the passenger compartment, a sufficient amount of fresh air flows through the ventilation layer of the backrest cushion and thus, even in the case of a rear seat in front of a warm passenger compartment rear wall, the desired temperature-conditioned comfort of the seat is achieved.

This object is achieved according to the invention by the features of claim 1.

The vehicle seat according to the invention has the advantage that the at least one second ventilator, which is assigned to the upper ventilation layer section, transports, owing to its air-conveying direction which is the other way around in relation to the at least one first ventilator, fresh air through the cushion cover and the air-guiding layer or ventilation layer into the heated rear space of the backrest, so that the at least one first ventilator, which is assigned to the lower ventilation layer section, is capable, for its part, of blowing significantly cooler air into the ventilation layer. As a result, the backrest cushion is overall ventilated better and with substantially cooler air, which leads to an improvement in the comfort of the seat. The gain in comfort of the seat is obtained by only small additional costs caused by the additional second ventilator and does not require any structural reconfiguration of the vehicle seat, so the seat concept for the front seats can also be retained unchanged for the rear seats. Since the backrest frequently already contains a plurality of seat-ventilation ventilators which are distributed uniformly over the backrest cushion, even these small additional costs are omitted, since the conveying direction of the ventilators assigned to the upper ventilation layer section merely has to be turned around, i.e. these ventilators simply have to be installed turned through 180°.

Advantageous embodiments of the vehicle seat according to the invention with expedient developments and refinements of the invention are indicated in the further patent claims.

The invention is described in greater detail below with

reference to an exemplary embodiment illustrated in the drawing. The drawing shows, in a diagrammatic illustration, part of a side view of a vehicle seat installed as the rear seat in a passenger compartment of a vehicle, with a backrest illustrated in longitudinal section.

The vehicle seat, part of which is illustrated in side view in Fig. 1, partially cut away and in diagrammatic form, is designed as a rear seat with a seat cushion 11 and backrest 12 and is arranged in the rear of a passenger compartment 13 of the vehicle. The passenger compartment 13 is separated from a trunk 15 by a rear wall 14 which merges at the upper edge of the backrest 12 into the rear parcel shelf or trunk cover 16. At the bottom, the rear wall 14 ends at a seat base 17 which is formed integrally with the floor trough of the vehicle and serves to receive the rear seat. The seat cushion 11 is fastened on the seat base 17 in such a manner that the backrest 12 bears with its upper end, which is shaped somewhat to the rear, against the rear wall 14 and an intermediate space, called rear space 18 of the backrest below, remains between the rear wall 14 and the backrest 12. Of a head restraint assigned to the rear seat, the head cushion 19 which is positioned above the trunk cover 16 is indicated.

The backrest 12, which is illustrated in longitudinal section, has a backrest cushion 20 on which backrest cheeks 21 for supporting the body of the seated person are integrally formed laterally. The backrest cushion 20 is composed of a cushion pad 22 which is fixed to a cushion support 23, an air-guiding or ventilation layer 24 covering the cushion pad 22, a pressure-distributing layer 25 covering the ventilation layer 24, and an air-permeable cushion cover 26 which spans the pressure-distributing layer 25 and terminates the front

side of the backrest cushion 20, which side faces a seat user. In the exemplary embodiment described, the cushion pad 22 is composed of a layer of rubberized hair with an integrated air-blocking layer, the ventilation layer 24 is composed of a pressure-resistant knitted spacer fabric, the pressure-distributing layer 25 is composed of a perforated foam material and the cushion cover 26 is composed of fabric or leather. An air duct 27 is formed in the lower region of the pressure-distributing layer 25 and, at a distance therefrom, an air duct 28 is formed in the upper region thereof. Each air duct 27, 28 completely penetrates the cushion pad 22 as far as the ventilation layer 24 and opens into the rear space 18 of the backrest. At least one first ventilator 29 is arranged in the lower air duct 27 and at least one second ventilator 30 is arranged in the upper air duct 28. However, the ventilators 29, 30 may also be fastened in a larger configuration on the rear side of the backrest cushion 20. The ventilators 29, 30 are inserted into the air ducts 27, 28 in a manner such that their air-conveying directions are directed oppositely to each other, with the result that the lower first ventilator 29 sucks up air from the rear space 18 of the backrest and the upper second ventilator 30 blows air into the rear space 18 of the backrest. An air barrier 31, which runs horizontally in the transverse direction of the seat, is arranged in the ventilation layer 24 and extends over the entire width of the backrest cushion 20 and separates the ventilation layer 24 into a lower section 241 and an upper section 242 in such a manner that no air exchange is possible between these two sections 241 and 242. The lower air duct 27 therefore opens onto the lower section 241 of the ventilation layer 24 and the upper air duct 28 onto the upper section 242 of the ventilation layer 24.

If the seat ventilation is activated, i.e. the ventilators 29, 30 are switched on, then the upper second ventilator 30 sucks up air from the upper region of the front side of the backrest cushion 20 via the air-permeable cushion cover 26, the perforated pressure-distributing layer 25 and the upper section 242 of the ventilation layer 24 and blows it out into the rear space 18 of the backrest. The conveying of air by the upper second ventilator 30 is indicated in the drawing by corresponding air flow arrows. The fresh air flowing in the upper section 242 of the ventilation layer 24 absorbs moisture and heat in the upper region of the backrest cushion 20 and removes them. This air displaces the significantly warmer air in the heated rear space 18 of the backrest. The lower first ventilator 29 sucks up the air which has been blown out by the upper second ventilator 30 and is significantly cooler than the air previously present in the heated rear space 18 of the backrest, and blows it into the lower section 241 of the ventilation layer 24. The air flows in the same manner through the lower section 241 of the ventilation layer 24 and emerges at the lower end of the ventilation layer 24, with the ventilation air in turn removing moisture and heat from the lower region of the backrest cushion 20. If the rear seat is unoccupied, some of the air flow also emerges via the lower region of the perforated pressure-distributing layer 25 and the air-permeable cushion cover 26 spanning this region, with the result that the surface of the backrest cushion 20 is cooled.

In the exemplary embodiment described, just two air ducts 27, 28 fitted with ventilators 29, 30 are illustrated in the cushion pad 22, with the lower air duct 27 opening onto the lower section 241 of the ventilation layer 24 and the upper air duct 28 opening

onto the upper section 242 of the ventilation layer 24. A plurality of air ducts assigned in each case to the lower section 241 and the upper section 242 of the ventilation layer 24 and having integrated ventilators are advantageously provided, said air ducts preferably being formed in the cushion pad 22 in a manner such that they are distributed uniformly over the lower and upper sections 241, 242 of the ventilation layer 24. All of the ventilators assigned to the lower section 241 have the same air-conveying direction and blow ventilation air from the rear space 18 of the backrest into the lower section 241 of the ventilation layer 24.

All of the ventilators facing the upper section 242 likewise have the same air-conveying direction, but suck ventilation air from the front side of the backrest cushion 20 through the upper section 242 of the ventilation layer 24.